

Ames' Leadership Team 2014-2016

National Aeronautics and Space Administration



Charles A. Smith
Center Director (Acting)



Steve F. Zornetzer
Deputy Director (Acting)



Steve F. Zornetzer
Associate Director,
Research and Technology



Deborah F. Feng
Associate Director,
Mission Support



Paul R. Agnew
Chief Financial Officer



John W. Boyd
Senior Advisor



Thomas A. Edwards
Director, Aeronautics



Michael D. Bicy
Director, Science



Eugene L. Tu
Director, Exploration
Technology



Jay Bookbinder
Director, Programs and Projects



David J. Korsmeyer
Director, Engineering



Michel Liu
Director, Safety and
Mission Assurance



Jerry L. Davis
Chief Information Officer



Gary L. Martin
Director, Partnerships



Charles W. Duff
Director, Center Operations



Janice Fried
Director, Human Capital



Dolores Beasley
Director, Strategic Communications
and Education



Barbara E. Miller
Director, Diversity and
Equal Opportunity Office



Tina L. Panontin
Chief Engineer



Thomas W. Berndt
Chief Counsel



Jacob Cohen
Chief Scientist



Harry Partridge
Chief Technologist



Karen C. Bradford
Chief of Staff

Front Cover Images:

1. Arcjet
2. Kepler & K2 missions
3. Hyperwall
4. Airspace Operations & Safety Program (AOSP)
5. Seedling Growth
6. SOFIA
7. IRIS

National Aeronautics and
Space Administration

Ames Research Center
Moffett Field, CA 94035



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Strategic Planning and Implementation
POCs: Kay Twitchell and Beverly Girten

Ames Research Center



www.nasa.gov

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2014 - 2016
center at a glance

NASA's mission

NASA's vision

We reach for new heights and reveal the unknown for the benefit of humankind.

Drive advances in science, technology, aeronautics, and space exploration to enhance knowledge, education, innovation, economic vitality, and stewardship of Earth.

- Safety
- Integrity
- Teamwork
- Excellence

NASA's core values

NASA strategic goals

Expand the frontiers of knowledge, capability, and opportunity in space.

Advance understanding of Earth and develop technologies to improve the quality of life on our home planet.

Serve the American public and accomplish our Mission by effectively managing our people, technical capabilities, and infrastructure.

Ames' mission

Ames Research Center (Silicon Valley) enables exploration through selected development, innovative technologies, and interdisciplinary scientific discovery.

In addition to the Ames core competencies provided below, Ames provides leadership in technologies for exploration, the search for habitable planets, quantum computing, synthetic biology, and airborne astronomy. Ames develops tools for a safer, more efficient national airspace and unique partnerships benefiting NASA's mission.



Ames' core competencies

Advanced Computing and IT Systems

Aerosciences

Air Traffic Management

Astrobiology and Fundamental Biology

End-to-End Low Cost Space Missions

Entry, Decent and Landing Systems

Intelligent/ Adaptive Human and Robotic Systems

Ames' strategic goals

Maintain expertise in information technology, aerospace and aeronautics research and engineering.

Conduct research in space, Earth, lunar and biological sciences.

Develop novel concepts for NASA in small spacecraft missions.

Expand public and private partnerships.

Contribute innovative, high performance and reliable exploration technologies.

Ames' objectives

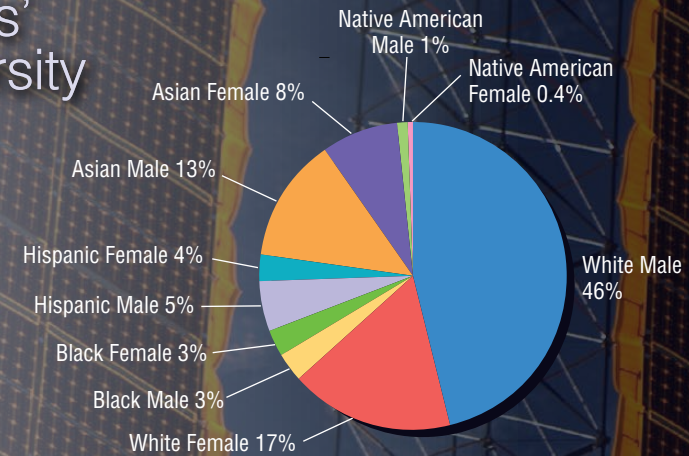
- Maintain Ames Research Center as a spaceflight innovation center.
- Successfully complete Ames' ongoing science missions.
- Maintain and strengthen Ames as the lead center in:
 - Entry, Descent and Landing Systems
 - Information Technology and Intelligent Robotics
 - Air Traffic Management
 - Biotechnology/Biology
 - Small Spacecraft
- Maintain Ames as an aeronautics center of excellence with a particular focus on technologies relevant to the next generation of air space systems, fundamental aeronautics design, and human factors research.
- Partner with other NASA centers, universities, government laboratories, private industry, and international entities. Maintain Ames Research Center on firm long-term footing through Enhanced Use Leases, Space Acts and other agreements.
- Operate Ames within current budget while maintaining essential services. Ensure employee support is given the highest priority. Optimize Ames' infrastructure.



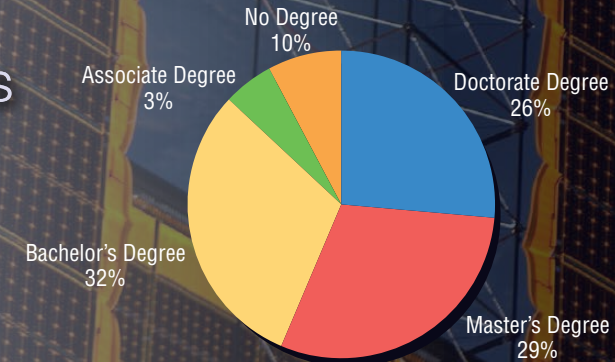
The Ames
TechEdSat Team

The Technology Educational Satellite (TechEdSat) projects uniquely pairs advanced university students with NASA researchers in a rapid design-to-flight experience lasting 1-2 semesters. The TechEdSat Nano-Satellite Series provides a rapid platform for testing technologies for future NASA Earth and planetary missions, as well as providing students with an early exposure to flight hardware development and management. TechEdSat-1 launched from the International Space Station (ISS) November of 2012, and TechEdSat-3p was launched a year later (November 2013). We currently have TechEdSat-4 aboard the ISS awaiting its launch, scheduled for late 2014. TechEdSat-5 is currently being developed and will be assigned to a mission in 2015.

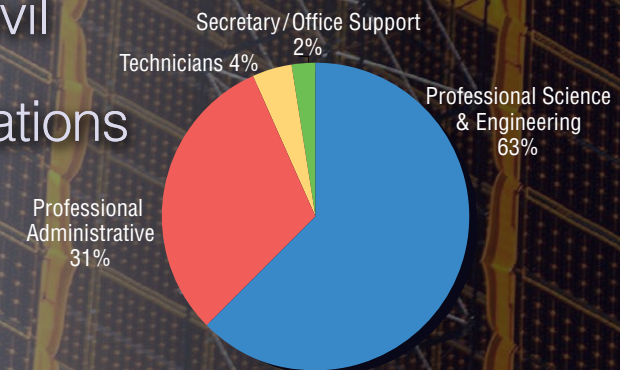
Ames' Diversity



Ames' Degrees



Ames' Civil Servant Classifications



Ames Research Center is an Equal Opportunity Employer

work force

Ames at work



1



2



3

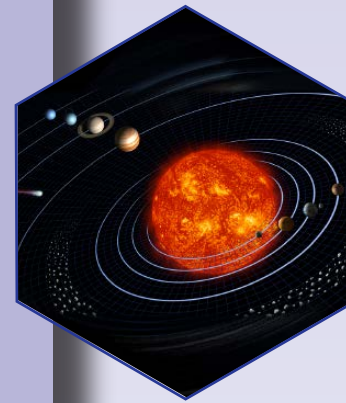


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- 1 The Ames Interface Region Imaging Spectrograph (IRIS) Operations Manager Jim Strong (right) and IRIS Chief Engineer Chris Hoffmann of the Lockheed Martin Solar and Astrophysics Laboratory, are busy monitoring the spacecraft orbit insertion and awaiting the first telemetry signal on spacecraft health.
- 2 Space Shop Manager, Alex Mazhari, is 3D printing end caps for linear actuators. The parts will be used on the DuCTT (Duct Climbing Tetrahedral Tensegrity) robot. The Space Shop rapid prototyping facility provides advanced manufacturing support for Ames missions.
- 3 Student researcher Curran Reddy and Ames scientist Sharmila Bhattacharya inspect tubes of fruit flies similar to the ones that will fly to the space station for the HEART FLIES investigation.
- 4 NASA researchers are investigating methods to improve airport surface efficiency by providing optimized traffic management advisories to address anticipated growth in traffic. The Spot and Runway Departure Advisor (SARDA) tool is being evaluated by ramp controller participants using a simulated Charlotte-Douglas International Airport. The activity is being conducted at the NASA Ames Future Flight Central facility, providing a 360-degree view of traffic in real-time. From left to right, Miwa Hayashi (researcher), a retired ramp controller participant, Victoria Dulchinos (researcher), and an airline ramp controller.
- 5 NASA Intern Cassandra Eddlemon prepares a copper hemispherical slug calorimeter in the test box of the Interaction Heating Facility (IHF) arc jet. The slug calorimeter is used to measure the heat flux in the 60 megawatt IHF test stream.

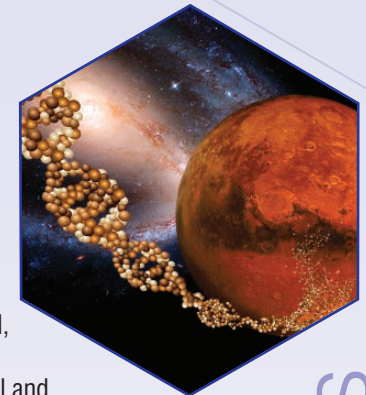


NASA's Solar System Exploration Research Virtual Institute (SSERVI)

SSERVI is a virtual institute comprised of competitively selected teams across the U.S., a growing number of international partnerships around the world, and a central office located at NASA Ames. SSERVI teams conduct innovative research to address basic and applied scientific questions fundamental to understanding the nature of our Solar System, including the Moon, near-Earth asteroids, and the moons of Mars. Collaborative research within and between the teams provides NASA with strategic knowledge necessary for designing our pathway of human exploration on the way to Mars.

NASA Astrobiology Institute (NAI)

Astrobiologists study the origins, evolution, distribution, and future of life in the universe. This interdisciplinary field requires a comprehensive, integrated understanding of biological, planetary, and cosmic phenomena. The NASA Astrobiology Institute (NAI) is a virtual, distributed organization of teams integrating their research and training programs with both national and international science communities. NAI uses innovative information technologies to conduct collaborative research and develop the community needed to effectively address astrobiology's profound questions: How does life begin and evolve? Is there life elsewhere in the universe? What is the future of life on Earth and beyond?



NASA Aeronautics Research Institute (NARI)

Through aeronautical research solicitations and challenges and prizes, the NASA Aeronautics Research Institute (NARI) promotes innovation in aeronautics across a broad spectrum of aeronautical challenges in the nation's air transportation system. The Institute coordinates those efforts, and communicates the outcome of the research conducted to interested parties both internal and external to NASA.



virtual institutes

objectives, work force, people and virtual institutes

2

capabilities

Space Sciences

- Extrasolar Planets
- Infrared Astronomy
- Planetary Science
- Heliophysics/Data Analysis
- Lunar Science
- Astrobiology
- Astrochemistry
- Mars Climate Modeling Center

Earth Sciences

- Atmospheric Sciences
- Biospheric Sciences
- Climate Modeling
- Ecological Forecasting
- Airborne Science Campaigns
- Unmanned Aircraft Systems (UAS)

Biological Sciences

- Molecular & Cell Biology
- Synthetic Biology
- Gravitational Biology
- Radiation Measurement Technologies
- ISS Payloads

Biotechnology

- Biomedical Engineering
- Space Medicine
- Environmental and Life Support Systems
- Synthetic Biology

Intelligent Systems

- Robotics
- Computer Systems and Engineering
- Software Engineering
- Intelligent/Adaptive Systems
- Physics-Based Diagnostics/Prognostics
- Data Analytics

High Performance Computing

- Petaflop-Scale Systems Engineering
- Quantum Computing
- Mass Data Storage
- Fundamental Modeling and Simulation
- Applied Modeling and Simulation
- Application Optimization
- Data Analysis and Visualization
- High-Performance Networks
- IT Security

Advanced Aerospace Materials and Devices

- Nanoscience
- Nanotechnology
- Bioengineering
- Computer Systems and Engineering
- Software Engineering
- Mathematical Modeling and Analysis
- Data Visualization

Space Transportation Technology/Thermal Protection Systems

- Chemistry/Chemical Engineering
- Advanced Materials and Processing Science
- Materials Engineering
- Thermal Systems
- Thermal Structures
- Aerothermodynamics
- Hyper-Thermal Testing
- System Architecture

Human Systems Integration

- Human-Autonomy Teaming
- Human Computer Interactions
- Human Performance
- Integration and Training

Small Spacecraft

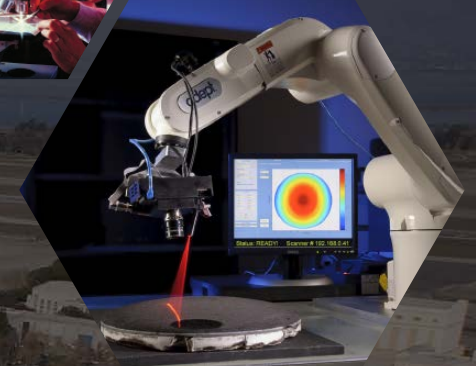
- Engineering Spacecraft Systems
- Mission Operations
- Mission Analysis and Design
- Rapid Prototyping and Manufacturing

Airspace Systems

- Air Traffic Management Systems
- Fundamental Human Factors Research
- Human Factors Engineering
- Advanced Analysis and Design Method Development
- Crew Systems and Aviation Operations
- Advanced Experimentation and Testing Technologies

Applied Aerospace and Information Technology

- Sensors and Data Acquisition
- Avionics
- Control Systems, Guidance and Navigation
- Communication Networks and Engineering
- Computer Systems and Engineering
- Software Engineering
- Data Acquisition, Management and Storage
- Artificial Intelligence
- Intelligent/Adaptive Systems
- Mathematical Modeling and Analysis
- Data Visualization
- Aerospace Systems Concept Development and Technology Assessment
- Advanced Analysis and Design Method Development
- Flight Dynamics
- Applied Aerodynamics
- Aeroelasticity
- Aerodynamics
- Thermal Systems
- Advanced Experimentation and Testing Technologies
- Simulation/Flight Research Systems
- Engineering Risk Assessment
- Systems Health Management



capabilities

facilities

Aerodynamics

- National Full-Scale Aerodynamics Complex (NFAC)
- Unitary Plan Wind Tunnel Complex
- Fluid Mechanics Laboratory

Airborne Sensor Facility

Airfield and Hangars

Animal Care Facility

Astrochemistry Laboratory

Biosciences Laboratory

Flight Processing Center

Chemical Vapor Deposition, Microscopy, Spectroscopy

Computational

- EcoSat Computational Facility
- Computation Laboratory
- NASA Earth Exchange (NEX)

Engineering Evaluation Laboratory

- Environmental Testing
 - Shock, Vibration, Thermal Vacuum, Spin Balance
- Instrumentation
- Verification & Validation
- Calibration

Entry Systems

- Arc Jet Facility
 - Aerodynamic Heating Facility
 - Interaction Heating Facility
 - Panel Test Facility
 - Turbulent Flow Duct Facility

Vertical Gun Range

- Electric Arc Shock Tube Facility
- Ballistic Range
- Thermal Protection Systems Materials Development Laboratory
- Ceramics Laboratory
- Materials Characterization Laboratory
- Ultra High Temperature Ceramic Laboratory
- Nanotechnology Materials Laboratory

Environment Chamber

- Planetary Aeolian Facility
- Microgravity Test Facility

Fabrication, Machining, Measurement

- Hardware Development, Rapid Prototyping
- Metals and Composites Fabrication
- Machining and Instrumentation
- Sensor Development
- Spaceflight Hardware Development
- Manufacturing Cost Estimating
- Outsource Procurement & Oversight
- Space Shop Rapid Prototyping Lab

Flight Simulations

- Vertical Motion Simulator
- Crew Vehicle Systems Research Facility
- Advanced Concepts Flight Simulator
- Boeing 747-400 Flight Simulator
- Interstellar Simulation Chamber
- Mission Simulation Facility
- Vestibular Research Facility

Flight Systems Research Laboratory

Human Systems Integration

- Advanced Controls and Displays Laboratory
- Airspace Operations Laboratory
- Cognition Laboratory
- Distributed Team Decision Making Laboratory
- Flight Cognition Laboratory
- Flight Deck Display Research Laboratory
- Human-Centered Systems Laboratory
- Human-Computer Interaction Laboratory
- Human Vibration Laboratory
- Man-machine Integration Design and Analysis System Laboratory
- Operational Based Vision Assessment Laboratory
- Psychophysiological Research Laboratory
- Vision Science and Technology Laboratory

Intelligent Systems

- Intelligent Robotics Laboratory
- Roverscape
- Flight Software Laboratory
- Advanced Control Technologies Laboratory
- Systems Health, Analytics, Resilience, and Physics (SHARP) modeling Laboratory
- Mission Control Technologies Laboratory
- Mission Tools Suite Laboratory
- Robust Software Engineering (RSE) Laboratory

Other Laboratories

- Thermal Protection Development Laboratory
- Human Performance Research
- Cryogenic
- Extremophile Microbiology
- Aerosol and Microphysics
- Atmospheric Radiation
- Lab-gas and aqueous
- Spacecraft Mobile Robot
- Smart Systems Research
- Genome Research Facility
- Advanced Studies Laboratory (ASL)
- Sustainability Base

Magnetic Standards Laboratory and Test Facility

Mars Climate Modeling Center

Mission Design Center

Multi-Mission Operations Center

Plant Growth Chamber

Future Flight Central

NASA Advanced Supercomputing Facility

- Supercomputing Systems
- High-End Storage Systems
- High Performance Networking
- Advanced Visualization Laboratories
- Quantum Artificial Intelligence Laboratory (QuAIL)
- Security Operations Center

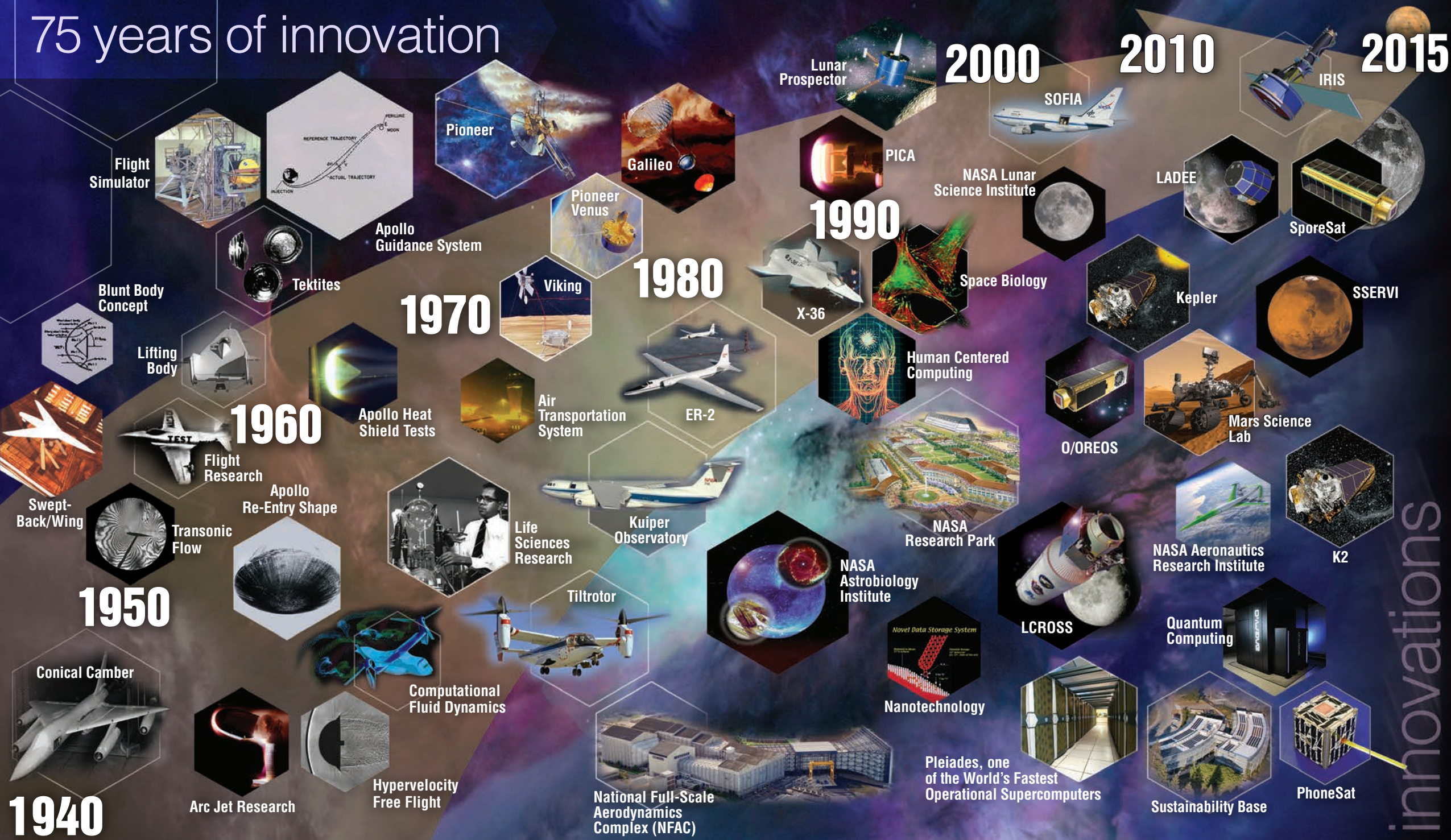
facilities

75 years of innovation

4

facilities and innovations

innovations

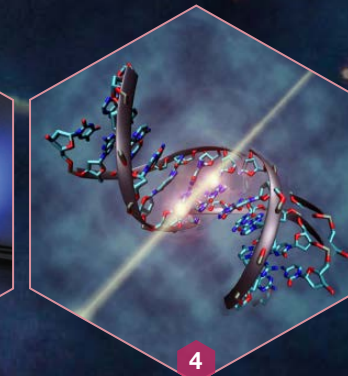
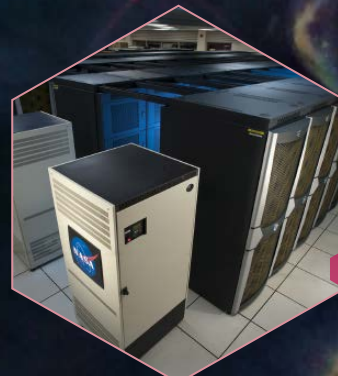


Looking ahead... the next 10 years

1 The Kepler and K2 missions continue the search for Earth-size planets orbiting in the habitable zone of stars like our sun.

2 A team at Ames is developing an efficient method of returning scientifically valuable Mars samples using emerging commercial space capabilities. Conceptual View of a capsule vehicle retrieving a sample canister that has been launched from Mars into space.

3 Scientists across the U.S. use the Pleiades supercomputer, one of the fastest in the world, along with advanced hyperwall visualization system to develop and visualize detailed models of galaxy evolution, improve tropical storm forecasting and assess climate change, enhance aircraft performance, and accelerate space vehicle design. Ames researchers at the Quantum Artificial Intelligence Laboratory (QuAIL) are exploring the potential for quantum systems to tackle optimization problems that are difficult or impossible for traditional supercomputers to handle. Applications relevant to NASA include machine learning, pattern recognition, mission planning and scheduling, distributed navigation and coordination, and system diagnostics and anomaly detection.



4 The BioSentinel autonomous nano satellite mission will use the simple model organism yeast as a biosensor to detect, measure, and correlate the impact of space radiation to living organisms over long durations beyond Low Earth Orbit. The results of this experiment will enable the development of countermeasures for radiation protection for future exploration missions. The Space Launch System (SLS) Exploration Mission 1 (EM-1) will deploy the BioSentinel Spacecraft, which performs a Lunar flyby and achieves its final heliocentric science orbit.

5 Ames operates Sustainability Base, a 50,000 square foot LEED Platinum office complex, as a living testbed for new technologies capable of revolutionizing buildings' energy and water management through intelligent systems capable of responsively optimized operations and maintenance. Ames scientists use both airborne assets and ground-based research to understand future impacts of climate change, increasing our sensitivity to local vulnerabilities and our commitment to resilient infrastructure. We 'lean forward' by creating partnerships extending the utility of Ames-derived technologies in addressing planetary sustainability.

6 The Small Spacecraft Technology Program (SSTP), one of nine programs within NASA's Space Technology Mission Directorate, is managed at Ames. The SSTP develops, matures, and demonstrates technologies to expand the capabilities of small spacecraft with particular focus on communications, propulsion, pointing, power, and autonomous operations.

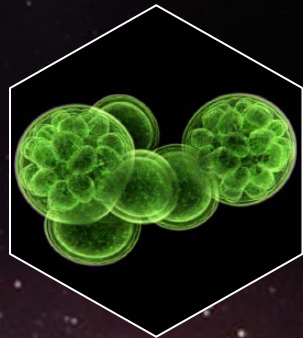
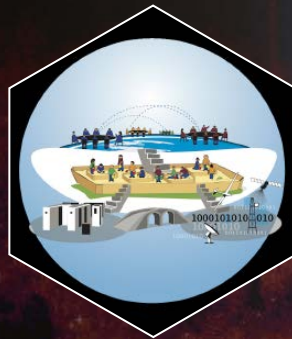
7 The Sensor Integration Evaluation Remote Research Aircraft (SIERRA) is a medium class, medium duration unmanned aircraft system (UAS) designed by the Naval Research Laboratory (NRL) to test new instruments and support NASA flight experiments.

8 As stewards of the Agency's consolidated arc jet test capability, design work is underway to transform the existing arc jet assets into the Next Generation Arc Jet Complex. This facility will be a modular, extensible, and efficient test platform for entry system material and concept development. The transformation will secure infrastructure capability for today's requirements and provide technical capability for future NASA spaceflight mission requirements.

spotlighted missions and projects

NASA Earth Exchange

NASA Earth Exchange (NEX) is a collaborative platform that brings scientists together with the tools, massive global data sets, and supercomputers necessary to accelerate research in Earth systems science and global change.

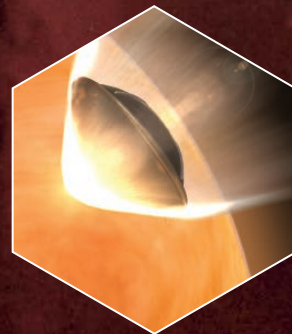


Space Synthetic Biology Program

The Space Synthetic Biology Program led by NASA Ames is developing biological technologies to: produce structural materials from regolith; create more sustainable, efficient and reliable life support systems; and produce food from in situ and recycled resources.

Heatshield for Extreme Entry Environment Technology (HEEET)

NASA Ames is leading the development of an innovative way of making robust, tailorable and mass efficient thermal protection material by weaving using textile engineering. The technology development project known as Heat-shield for Extreme Entry Environment Technology (HEEET) is targeted for mission infusion for the upcoming Discovery-2014 Announcement of Opportunity (AO) competed missions that could enable in-situ missions such as Venus probes, landers and balloon missions, Saturn and Uranus probes and Very High Speed Sample Return missions to Earth.



Major Missions and Projects Leadership



Carol W. Carroll
Director
ISS Utilization Office



Michael R. Dudley
Director, NASA
Aeronautics
Research Institute
(NARI)



Yvonne Pendleton
Director, Solar System
Exploration Research
Virtual Institute
(SSERVI)



Carl B. Pilcher
Director,
NASA Astrobiology
Institute (NAI)
(Acting)



James M. Strong
Deputy Project
Manager, Interface
Region Imaging
Spectrograph (IRIS)



Charles K. Sobeck
Project Manager,
Kepler/K2



George L. Sarver
Deputy Project
Manager,
Stratospheric
Observatory for Infrared
Astronomy (SOFIA)



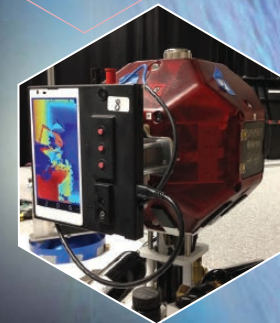
James O. Arnold
Project Manager,
Planetary Defense



Rupak Biswas
Project Manager,
NASA High-End
Computing

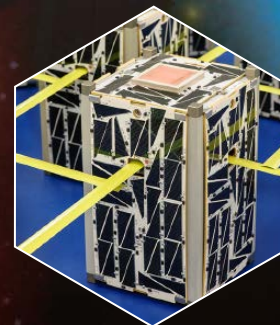
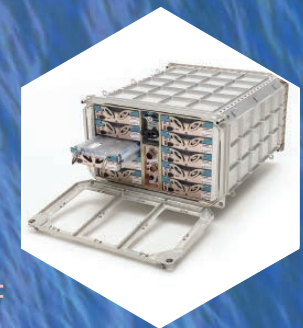
Smart SPHERES

Ames operates and maintains the SPHERES research facility aboard the space station. This facility includes technologies for visual-based navigation, electro-magnetic formation flight, fluid dynamics, and smartphone. Smart SPHERES is a free-flying robot that can be remotely operated by astronauts in space, or by mission controllers on the ground. We are developing Smart SPHERES to perform a variety of spacecraft monitoring and logistics tasks.



International Space Station Research

Ames is playing an increasingly important role in enabling research and full utilization of the International Space Station (ISS). Ames engineers are building and delivering new analytical laboratory capabilities for ISS, while our scientists are conducting innovative biological research experiments aboard the Station.

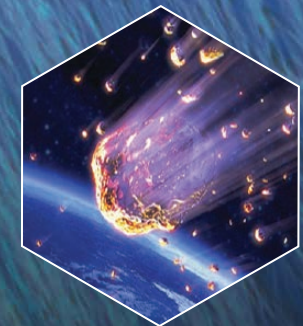


Edison Demonstration of Smallsat Networks (EDSN)

The Edison Demonstration of Smallsat Networks (EDSN) provides a proof of concept for future large constellations of satellites performing coordinated time varying and spatially distributed observations opening new avenues in Heliophysics, Astrophysics, Planetary and Earth science. EDSN is a swarm of eight identical 1.5U Cubesats with crosslink, downlink and science collection capabilities using redundancy in numbers and a risk tolerant architecture to drive new technologies in distributed space communications, attitude control, autonomous operations and leveraging COTS hardware and software.

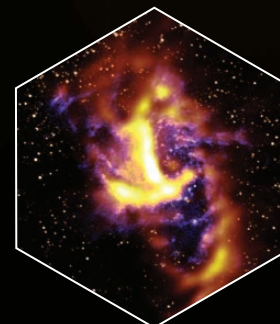
Planetary Defense

An interdisciplinary team consisting of scientists and engineers at Ames will lead a major new planetary defense initiative to defend Planet Earth from potentially hazardous asteroid (PHA) impacts such as that which struck Chelyabinsk Russia on February 15, 2013. The Ames team will utilize expertise within the center and collaborations with external partners to characterize asteroids, perform simulations of asteroid entry and breakup, assess risk for both land and ocean impacts, provide recommendations for mitigation approaches/estimated cost and develop concepts to detect impending strikes within a week to ten days from PHA's using small satellites.



SOFIA

The SOFIA mission, an observatory carried into the Earth's dry stratosphere by a 747SP aircraft, provides imaging and spectroscopic data across the entire infrared spectrum to address a plethora of science topics, including: the physical processes leading to the creation of stars, the role of dust grains in the Universe, the chemical pathways in space leading to the formation of important molecules such as water, and the nature of planetary atmospheres within our own Solar System. Picture shown is the Galactic Center taken with SOFIA's FORCAST camera.





partnerships

Innovation is the lifeblood of the American economy. It is the foundation of our standard of living and our economic survival. We survive – and thrive – by innovating technologies that improve our lives through new products, new markets and new jobs. Innovation is essential for minimizing the impacts of global climate change and for expanding economic opportunities and public benefits beyond Earth. Located in the high-tech nexus of Silicon Valley, NASA Ames is at the heart of American innovation, sponsoring and creating unique technologies that enable aeronautics and space exploration missions and inspire new commercial products and opportunities through partnerships. Partnerships, both public and private, are the cornerstone to achieving success in business. These partnerships are technological in nature, create new business opportunities, support the expansion of the commercial space industry, collaborate with international entities, and enable small business and university innovative research and technology transfer.

Technology Partnerships

Ames develops a multitude of groundbreaking technologies critical to the success of the nation's aeronautics and space exploration missions. Many of these technologies have significant commercial value. They are 'game changers' with the potential to bring prosperity to America through the creation of entirely new industries, products, services and jobs. NASA and Ames are committed to maximizing the value of the taxpayer's investment by transferring our cutting-edge technologies to private industry, academia, non-profits and other Government agencies to benefit the quality of life on Earth.



Ames 2013 Spinoffs

- Mars Technologies Spawn Durable Wind Turbines
- Heat Shield Paves the Way for Commercial Space
- Software Accelerates Computing Time for Complex Math
- Data Mining Tools Make Flights Safer, More Efficient
- Procedure-Authoring Tool Improves Safety on Oil Rigs
- Vision Algorithms Catch Defects in Screen Displays

Ames 2012 Spinoffs

- Web Solutions Inspire Cloud Computing Software
- Anti-Icing Formulas Prevent Train Delays
- Gigapixel Images Connect Sports Teams with Fans



International Partnerships

Ames works on international partnerships in concert with NASA's Office of International and Interagency Relations. Over 25 countries have joined Ames in scientific and technical research. Ames particularly reaches out to emerging space nations to achieve America's goals of promoting peace and the peaceful uses of outer space.

Small Business Innovative Research/ Small Business Technology Transfer (SBIR/STTR)

Ames is NASA's lead center for the SBIR and STTR programs. These programs are science based and reflect the mission of NASA. The Agency views these two programs as an integral tool to realizing both the Agency's and nation's technological innovation goals. The SBIR program funds research, development, and demonstration of innovative technologies that can fulfill NASA's technical needs and also have significant potential for successful commercialization. The STTR operates in a similar manner and also requires efforts proceed in partnership with a non-profit organization or university to mature and commercialize an innovation.



Emerging Space Office (ESO) – Space Portal

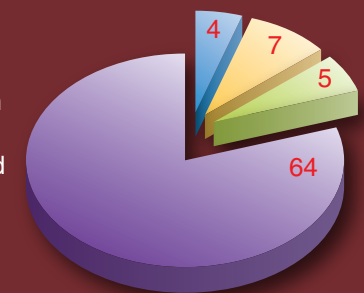
Ames is the lead center for the NASA Emerging Space Office (ESO). ESO monitors and provides analytical support to the Office of the Chief Technologist on the state of the rapidly growing commercial space sector to assist in NASA's legislated responsibility to "seek and encourage, to the maximum extent possible, the fullest commercial use of space." The Space Portal located at Ames, is an Ames-unique organization that analyzes and catalyzes new commercially leveraged opportunities to promote the economic development of space for public benefit.

Planetary sustainability also part of the Space Portal, offers numerous opportunities for mutually beneficial partnerships in minimizing the consequences of global climate change, such as fighting drought-caused fires, managing agricultural issues and responding to catastrophic events; areas of particular importance to Ames as California is expected to be one of the states hardest hit by global climate change over the next decade.

NASA Research Park

NASA Research Park (NRP) is an established regional innovation cluster that facilitates commercialization by serving as a technology accelerator through vital and robust onsite collaborations. In its 11th year, with over 80 partners, the NRP is a world-class, shared-use R&D and education campus for industry, academia, non-profits, and government, a center for innovation and entrepreneurship with a unique community of scientists, engineers, students and educators with a shared mission. In 2009, the National Research Council recognized NASA's achievements when it cited NRP as a global "best practice" for research, science, and technology parks and stated that NRP has "made great progress, exceeding expectations, and enacting NASA plans with remarkable effectiveness."

NRP Partners - 2014



- Commercial Space Partners
- Non-Profit Partners
- Academic Partners
- Industry Partners

education & public outreach

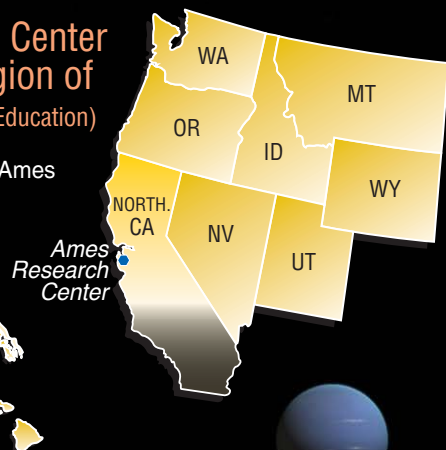
In alignment with the Education portfolio four lines of business, Ames provides authentic learning experiences designed around NASA's unique missions while promoting the learners' engagement in science, technology, engineering and mathematics (STEM) based on NASA's resources. NASA partners with underserved populations to bring together educators, administrators, students and families in a sustained involvement with NASA's education and outreach programs. Ames provides innovative opportunities for learners, educators and institutions through various programs/projects/collaborations and partnerships. Ames is responsible for the execution of components from the Agency's numerous and varied educational programs across the Nation, in particular the 10 Western States (Alaska, northern California, Hawaii, Idaho, Montana, Nevada, Oregon, Utah, Washington and Wyoming) as well as the U.S. territories of the Pacific (American Samoa, Guam, Northern Mariana Islands).

NASA's Education Portfolio Four Lines of Business:

- **STEM Engagement:** Provide opportunities for participatory and experiential learning activities that connect learners to NASA-unique resources
- **Internships, Fellowships, Scholarships:** Provide NASA work experiences, research opportunities, and financial assistance to increase the number of STEM graduates
- **Educator Professional Development:** Prepare STEM educators and leaders to deliver quality STEM instruction using NASA-unique content
- **Institutional Engagement:** Improve the capacity of U.S. institutions to deliver effective STEM education and NASA mission-related research

Ames Research Center Geographic Region of Responsibility (Education)

Areas Assigned to Ames



Public Outreach

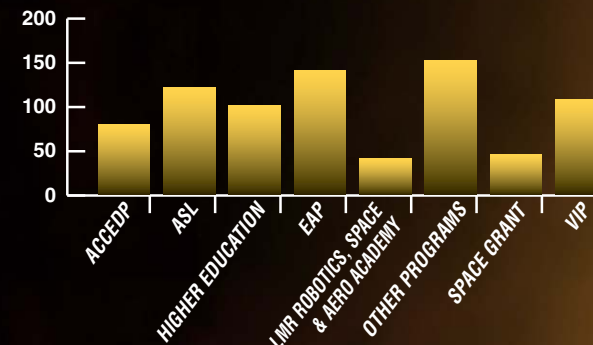
The Ames Exploration Encounter, located in a supersonic wind-tunnel facility, provides a glimpse into real life STEM careers through engaging lessons, simulations and role-playing. The NASA Ames Visitors Center is located outside the main gate, allowing all members of the public to engage in NASA via a diverse array of multi-media activities and exhibits. These two locations serve over 98,000 people per year 48,000 students, 17,000 educators and 31,500 members of the public each year.

NASA employees engage learners, educators and community members by attending events and through the NASA Speakers Bureau putting a face to the name NASA. Over 200 speaker requests are met annually reaching over 55,000 individuals in small groups of 25 to 50 people at a time. Another flagship of Ames outreach programs, hosting public learning and viewing of special missions that bring out 500 to 10,000 of the viewing public. Throughout 2014, Ames celebrated its 75th anniversary with a series of public events. In July, a "Living Museum" brought the excitement of recent Ames missions directly to our neighbors in the cities of Mountain View and Sunnyvale. The Living Museum was 17 eye-catching exhibits in 15 prominent locations, including storefronts, eateries, and public buildings. Much like a similar Living Museum to celebrate Ames' 70th anniversary in 2009, these exhibits reached more than 100,000 of NASA's biggest fans.

student research opportunities

Students at Ames

In 2014 Ames hosted approximately 798 students, most of whom participated in hands-on research and education activities in over 20 agency programs.



Science, Technology, Engineering, and Mathematics (STEM)

Ames hosts a multitude of national and center-unique Science, Technology, Engineering, and Mathematics (STEM) opportunities for undergraduate students, graduate students, and faculty as well as community college students. Ames leads the agency in conducting academies including the NASA Academy for Space Exploration and NASA Aeronautics Academy. These academies emphasize leadership, teamwork, research, and creativity in research. Ames also recognizes the value of a global perspective and has a vibrant international community of interns, fellows, and post-docs.

NASA Ames Initiates Volunteer Internship Program

Ames newest internship opportunity, the Volunteer Internship Program (VIP) made its debut in Fall 2013 and has quickly become one of the most popular alternatives for students who are seeking opportunities to work with NASA. The program allows students high school, undergraduate, and graduate students who are both attending school at least half-time and at least 16 years of age the capacity to volunteer their services to NASA Ames Research Center. In accordance with guidance provided by the authority of Title 5 USC subsection 3111, the VIP provides eligible students an opportunity for hands-on, unpaid work experience with scientists, engineers, project managers, and others on various NASA related projects, while simultaneously allowing students to meet educational goals and significantly add to their academic resumes.

Once accepted into the program and matched to a NASA mentor, VIP students are required to attend an orientation session as well as any required trainings prior to actively working on projects. VIP students are also invited to participate in all activities open to NASA Ames Center members, such as the student poster sessions, seminars, and other student oriented activities.

During Summer 2014, Ames welcomed over 100 VIP student participants to the program.

NASA Robotics Alliance Project (RAP)

The NASA Robotics Alliance Project uses NASA's inspiring missions, unique facilities, and specialized work force in conjunction with the best emerging technologies to increase the production of capable American robotics engineers entering America's workforce. RAP establishes robotics academies at key NASA Centers to train upper elementary and undergraduates to become talented young engineers. Over 10,000 students are currently engaged in RAP activities and over 75,000 attended RAP events.



Quantum Education

Quantum Education is an internship program, offered by the Ames Office of Education and Public Outreach, for rising high school seniors who are advanced in science and computer programming. The Problem Based Learning (PBL) curriculum is designed to engage the students in a complex, authentic challenge that requires them to utilize 21st century competencies, such as collaboration, innovation, and communication, to complete a task based upon NASA-related content. The interns are required to work and make connections across multiple STEM disciplines, such as computer programming, physics, and manipulating Arduinos electronics to resolve a real-world problem.

iGEM

Beginning in 2011, NASA Ames Research Center has hosted the Stanford-Brown (now Stanford-Brown-Spelman) iGEM team. iGEM (international Genetically Engineered Machine competition) is the premiere undergraduate synthetic biology competition in the world. The team, under the direction of Dr. Lynn Rothschild, has completed over a dozen projects pioneering such areas as the use of synthetic biology to design a human Mars colony (2011), to solve problems in Astrobiology (2012), to explore communication (2013) and to build a biological Unmanned Aerial System (UAS) (drone; 2014), and has brought home awards and has consistently ranked in the top 16 worldwide.

key awards

- Robert J. Collier Trophy
- NASA Headquarters Annual History Award
- NASA Inventor of the Year Award
- NASA Software of the Year Award
- American Institute of Aeronautics and Astronautics Fellows
- American Physical Society Fellows
- American Geophysical Union Fellows
- Geochemical Society Fellows
- European Association of Geochemistry Fellows
- American Association for the Advancement of Science Fellows
- American Meteorological Society Fellow
- California Academy of Sciences Fellows
- Chambliss Astronomical Writing Award, American Astronomical Society (AAS)
- National Academy of Engineering Members
- Gerard P. Kuiper Prize, AAS Division of Planetary Sciences
- Harold C. Urey Prizes, AAS Division of Planetary Sciences
- Carl Sagan Medal, AAS Division of Planetary Sciences
- Klumpke-Roberts Award, Astronomical Society of the Pacific
- 2010 Federal Energy and Water Management Award
- Sir Arthur Clarke Innovator's Award
- Space Frontiers Award
- 2010 NASA Software of the Year Award, NASA Kepler Science Operations Center (SOC)
- NASA Government Invention of the Year
- NASA Commercial Invention of the Year Award
- White House GreenGov Award
- NASA Sustainability Award
- U.S. General Services Administration (GSA) Award for Green Innovation
- San Jose Silicon Valley Award for Best Green Public Structure

Kepler and K2 mission Awards & Recognition

- 2014 National Space Club Robert G. Goddard Trophy
- 2012 AIAA Space Science Award
- 2012 Space Frontier Foundation Vision to Reality Award
- 2012 Space Foundation "John L. "Jack" Swigert Jr., Award for Space Exploration"
- 2012 National Space Club Nelson P. Jackson Aerospace Award
- 2012 Aviation Week Laureate award for space exploration
- 2010 NASA Software of the Year Award- Kepler Science Operations Center
- 2009 Popular Science Best of What's New- the Kepler Space Telescope
- 2009 Popular Mechanics 10 Most Brilliant Innovators- the Kepler Space Telescope
- Journal/Magazine covers – The Kepler mission has been the subject of more than a dozen cover stories in the past two years: Sky & Telescope, 01/09; Nat Geo, 12/09; Popular Science Best of What's New, 2009; Breakthrough Award from Popular Mechanics, 2009; Aerospace America, 01/10; Science, 10/10; Astronomy, 11/10; Nature, 2/11; ScienceNews, 6/11; WeeklyReader News, 11/11; AdAstra National Space Society Magazine, Fall 2011; Nature, 2/12



NASA Ames Human Resources Specialist Receives Causey Award (2014)

NASA Ames Human Resources Specialist Linda M. Jensen was honored with a Causey Award for shifting the culture at NASA Ames Research Center and improving its workforce capabilities. Causey awards are given to recognize professionals who have gone above and beyond in the human resources arena to help the government operate better.

NASA Ames Researcher Receives National Academy of Sciences Henry Draper Medal (2013)

NASA Ames researcher William J. Borucki was a recipient of the 2013 National Academy of Sciences Henry Draper Medal. William was recognized for his founding concept, unflagging advocacy, and visionary leadership during the development of NASA's Kepler mission, which has uncovered myriad planets and planetary systems with unforeseen and surprising properties.

NASA Ames Researchers Receive Presidential Early Career Awards (2012 & 2011)

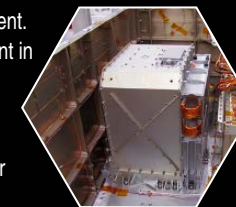
President Obama has named Ames researchers as recipients of the Presidential Early Career Award for Scientists and Engineers (PECASE).

In 2012 Joshua Alwood was recognized for performing innovative research examining the combined effects of radiation and microgravity on bone, a research area highly relevant to human exploration. His research creates a knowledge base that may improve skeletal health for astronauts in exploration-class missions.

In 2011 Jessica Koehne was recognized for exceptional dedication to the development of nano-bio sensing systems for NASA mission needs. Her technology has been applied to crew health and environmental monitoring and has been applied outside of NASA to better understand neurodegenerative diseases such as Parkinson's Disease.

Ames Wins 2013 NASA Government Invention of the Year Award

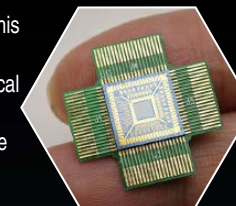
Ames received the award for developing the CheMin ("Chemistry and Mineralogy") X-Ray Diffraction/X-Ray Fluorescence Instrument. CheMin is a flight-qualified instrument that for the first time provides the ability to perform a quantitative analysis of minerals present in a sample of rock or soil in a spaceflight-qualified, small payload. CheMin includes a number of novel methods and mechanisms including the first use of a Charge-Coupled Device (CCD) imager to record the positions and energies of diffracted and fluoresced X-ray photons, a compact space-qualified X-ray source, and a vibrating sample holder which allows powder XRD patterns to be collected without complex and precise movements of source, sample and detector components. The Powder Movement System for Analytical Instruments, which is a part of the CheMin instrument, won NASA's Commercial Invention of the Year in 2010.



CheMin is deployed on the Mars Science Laboratory mission as part of the analytical laboratory of the rover Curiosity. CheMin has been operating on Mars since August 6, 2012. During the years 2012-2013, CheMin returned the first in situ definitive and quantitative mineralogical analysis of Mars, and identified the first habitable environment on another planet. As a result of CheMin technology, discussions of the analyzed rocks and soil on Mars now revolve around the interpretation of the environment of formation of the minerals, rather than a discussion of what the mineralogy might be.

Ames Wins 2012 Government Invention of the Year Award

Ames received the award for developing "High Sensitive, Low Power and Compact Nano Sensors for Trace Chemical Detection." This invention includes methods and systems for estimating one, two or more unknown components in a gas using carbon nanotubes. The electronic sensors developed from these carbon nanotubes are inexpensive, lightweight and consume very little power. A typical sensor device based on this concept includes a set of inter-digitated metal microelectrodes fabricated by photolithography on an electrically insulating substrate. NASA has deployed the sensors to detect trace gases in the crew cabin on the International Space Station. Other federal agencies are using sensors based on this technology to detect trace gases in various environments.



The innovative sensors have also been used for trace chemical detection in planetary exploration, air monitoring, leak detection, and hazardous agent detection using cell phones. Potential future applications include environmental monitoring, industrial process monitoring and control, and bio-medical diagnosis.

Ames Wins 2011 NASA Government Invention of the Year Award

Ames received the award for developing Toughened Uni-piece Fibrous Reinforced Oxidation-Resistant Composite (TUFROC), a low-cost, lightweight, two-piece, thermal protection system (TPS) for use on space vehicles during atmospheric re-entry at hypersonic speed. TUFROC, a patented technology invented by David A. Stewart and Daniel B. Leiser of Ames, has been successfully demonstrated on the X-37B Reusable Launch Vehicle.



The technology consists of a high temperature, impregnated carbonaceous cap mechanically attached to a lightweight fibrous silica-base material. The key innovations enable the integration of the surface treated carbon cap with the silica-base insulation, which otherwise would fail from mechanical, chemical or thermal factors. TUFROC is the first lightweight, low cost, flight proven, reusable TPS with sustained operational capabilities at temperatures above 3,000 degrees Fahrenheit.

Ames wins Software of the Year Award 11 Times in 20 Years

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| ■ 2014 Configuration Based Aerodynamics (CBAERO) | ■ 2002 Cart3D: A Package for Automated Cartesian Grid Generation and Aerodynamic Database Creation |
| ■ 2012 NASA App | ■ 1999 Remote Agent |
| ■ 2010 NASA Kepler Science Operations Center (SOC) | ■ 1998 Center TRACON Automation System |
| ■ 2009 NASA World Wind Java Software Development Kit and Web Mapping Services Server | ■ 1995 Flow Analysis Software Toolkit |
| ■ 2007 Data Parallel Line Relaxation Code | ■ 1994 Incompressible Navier-Stokes Flow Solver in Three Dimensions |
| ■ 2006 Future Air Traffic Management Concepts Evaluation Tool | |